



U.S. ARMY MEDICAL SURVEILLANCE ACTIVITY

VOL. 03 NO. 02

March 1997

MSMR

Medical Surveillance Monthly Report

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Data in the MSMR is provisional, based on reports and other sources of data available to the Medical Surveillance Activity. Notifiable conditions are reported by date of onset (or date of notification when date of onset is absent). Only cases submitted as confirmed are included.

Report Documentation Page			<i>Form Approved OMB No. 0704-0188</i>		
<p>Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.</p>					
1. REPORT DATE MAR 1997	2. REPORT TYPE	3. DATES COVERED 00-00-1997 to 00-00-1997			
4. TITLE AND SUBTITLE Medical Surveillance Monthly Report (MSMR). Volume 3, Number 2, March 1997			5a. CONTRACT NUMBER		
			5b. GRANT NUMBER		
			5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S)			5d. PROJECT NUMBER		
			5e. TASK NUMBER		
			5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army Center for Health Promotion and Preventive Medicine, Armed Forces Health Surveillance Center (AFHSC), 2900 Linden Lane, Suite 200, Silver Spring, MD, 20910			8. PERFORMING ORGANIZATION REPORT NUMBER		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSOR/MONITOR'S ACRONYM(S)		
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)		
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 16	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

Surveillance Trends

Pneumonia Among Active Duty Soldiers January 1990-September 1996

The Army Medical Surveillance Activity assessed rates, trends, and correlates of risk of pneumonia hospitalizations among active duty soldiers during the period January 1990 through September 1996. Records of hospitalizations of soldiers (source: PASBA, Fort Sam Houston, Texas) were searched to identify those with a principal discharge diagnosis of "pneumonia" (International Classification of Diseases, 9th revision, codes 480-487) or a principal diagnosis of "acute respiratory infection", e.g. pharyngitis, laryngitis, bronchitis, (ICD-9 codes 460-466) and a secondary diagnosis of "pneumonia." If soldiers had multiple pneumonia admissions, only the first was retained for analysis. Denominators for rate calculations were derived from semiannual (1990-1992) or monthly (1993-1996) Army active duty personnel rosters (source: Defense Manpower Data Center, Monterrey, California).

To assess geographic correlates of risk, we identified states of residence prior to entering military service for soldiers on active duty in the Army during the study period (source: Military Entrance Processing Command, North Chicago, Illinois). To determine if certain states were over- or under-represented among pneumonia cases, for each state we calculated an "expected" number of cases by multiplying the state's proportional representation among all soldiers by the total number of pneumonia cases. Variations between observed and expected cases were then calculated for each state, and the statistical significance of variations was assessed based on the chi-square distribution (nominal statistical significance defined as $p < .05$).

For analysis of personal risk factors, pneumonia records were matched to health risk appraisals (HRA) completed between 1990 and 1995 (source: HRA Resource Center, Directorate of Health Promotion and Wellness, USACHPPM). If cases had multiple HRAs, only the earliest was used for analysis. In addition, only HRAs that preceded dates of pneumonia hospitalizations were used ($N=483$). Noncases were soldiers who served on active duty in the Army between 1990 and 1996 and were not hospitalized with pneumonia and completed an HRA ($N=265,590$). Demographic data for cases and noncases were derived from hospitalization, military personnel, military applicant, and health risk appraisal data.

We began the risk factor analysis by evaluating the strength of associations between pneumonia and individual variables of interest (e.g., demographic, tobacco use, psychosocial factors). Factors that were significantly

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correlated with pneumonia risk in univariate analyses were then individually assessed in multivariate models that controlled for effects of age and race/ethnicity. To enhance the parsimony of the final model, responses of categorical variables were combined when different response levels had similar predictive effects (e.g., for some variables, responses of "seldom" and "sometimes" were combined). The final multivariate model included main effects of, and all possible two-way interactions between, factors that had significant independent predictive effects.

Overall: During the period, there were 9,465 pneumonia hospitalizations among soldiers. In more than 85% of cases, the infectious agent was unspecified. The crude incidence rate was 231 per 100,000 soldiers per year. Pneumonia rates were highest in 1990, were stable from 1991 to 1993, and then declined through 1996 (figures 1-4).

Seasonality (figure 1): There was striking seasonality to pneumonia incidence. Each year,

the lowest monthly rate occurred in either May or June. With remarkable consistency, rates rose through each summer to peaks in early fall — October had the highest monthly rate during five of the six fall-winter seasons. Following peaks in early fall, rates either plateaued before declining (e.g., 1990-1) or declined through the winter (e.g., 1995-96) to troughs in late spring.

Demographic: Pneumonia rates did not significantly vary between men and women (figure 2, page 7). However, they were consistently higher among white nonhispanic compared to black nonhispanic soldiers. Except for CY 1995, rates among Hispanic soldiers were intermediate between blacks and whites, and those who represented other racial/ethnic groups were lowest of all (figure 3, page 7). Rates generally declined with increasing age until age 40. In fact, rates among teenaged soldiers were at least fivefold higher than among any other age group (figure 4, page 10). A disproportionate number of hospitalizations

Continued on page 7

Figure 1. Pneumonia Hospitalizations by Month, Jan 1990 - Jun 1996

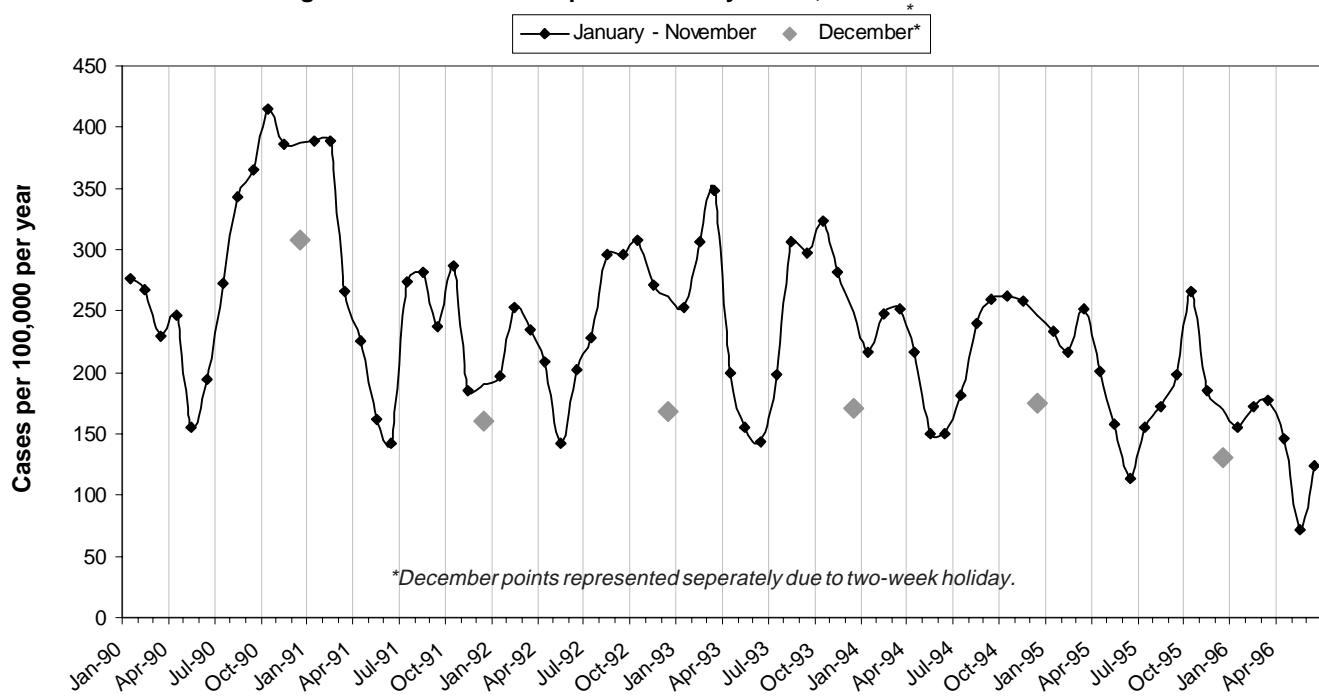


TABLE I. Cases of selected notifiable conditions, United States Army*
February, 1997

Reporting MTF/Post**	Total number of reports submitted Feb-97	Environmental Injuries			Viral Hepatitis			Malaria	Varicella		
		Active Duty		CO intox.	A	B	C		Active Duty	Active Duty	
		Heat	Cold						Other Adult	Other Adult	
NORTH ATLANTIC RMC											
Walter Reed AMC	19	-	-	-	-	-	-	-	1	-	
Aberdeen Prov. Ground	-	-	-	-	-	-	-	-	-	-	
FT Belvoir, VA	-	-	-	-	-	-	-	-	-	-	
FT Bragg, NC	6	-	3	-	-	-	-	-	-	-	
FT Drum, NY	5	-	1	-	-	-	-	-	1	-	
FT Eustis, VA	1	-	-	-	-	-	-	-	-	-	
FT Knox, KY	68	-	-	-	-	-	-	-	-	-	
FT Lee, VA	6	-	-	-	-	-	-	-	-	-	
FT Meade, MD	10	-	-	-	-	-	-	-	-	-	
USMA, West Point, NY	-	-	-	-	-	-	-	-	-	-	
CENTRAL RMC											
Fitzsimons AMC	-	-	-	-	-	-	-	-	-	-	
GREAT PLAINS RMC											
Brooke AMC	-	-	-	-	-	-	-	-	-	-	
FT Carson, CO	55	-	-	-	1	-	-	-	-	-	
FT Hood, TX	222	-	-	-	1	-	-	-	1	-	
FT Leavenworth, KS	-	-	-	-	-	-	-	-	-	-	
FT Leonard Wood, MO	24	-	2	-	-	-	-	-	11	4	
FT Polk, LA	35	-	1	-	-	-	-	-	-	-	
FT Riley, KS	15	-	-	-	-	-	-	-	-	-	
FT Sill, OK	31	-	2	-	1	-	-	-	-	-	
Panama	-	-	-	-	-	-	-	-	-	-	
SOUTHEAST RMC											
Eisenhower AMC	29	-	-	-	-	1	-	-	-	-	
FT Benning, GA	-	-	-	-	-	-	-	-	-	-	
FT Campbell, KY	27	-	1	4	-	-	-	-	2	-	
FT Jackson, SC	-	-	-	-	-	-	-	-	-	-	
FT McClellan, AL	-	-	-	-	-	-	-	-	-	-	
FT Rucker, AL	-	-	-	-	-	-	-	-	-	-	
FT Stewart, GA	-	-	-	-	-	-	-	-	1	-	
SOUTHWEST RMC											
Wm Beaumont AMC	59	-	-	-	-	1	-	-	-	1	
FT Huachuca, AZ	20	-	-	-	-	-	-	-	-	-	
FT Irwin, CA	10	-	-	-	-	-	-	-	-	-	
NORTHWEST RMC											
Madigan AMC	55	-	-	-	-	-	-	-	-	-	
FT Wainwright, AK	-	-	-	-	-	-	-	-	-	-	
PACIFIC RMC											
Tripler AMC	68	-	-	-	-	-	-	-	-	-	
OTHER LOCATIONS											
Europe	149	-	-	-	-	6	-	-	4	-	
Korea	-	-	-	-	-	2	-	-	-	-	
Total	914	0	10	4	3	10	0	0	21	5	

* Based on date of onset.

** Reports are included from main and satellite clinics. Not all sites reporting.

Date of Report: 7-Mar-97

TABLE I. Cases of selected notifiable conditions, United States Army* (continued)
February, 1997

Reporting MTF/Post**	Salmonellosis			Shigella			Campylobacteriosis			Tuberculosis	
	Active Duty	Other		Active Duty	Other		Active Duty	Other		Active Duty	Other
		Adult	Child		Adult	Child		Adult	Child		
	Cum. 1997	Cum. 1997	Cum. 1997	Cum. 1997	Cum. 1997	Cum. 1997	Cum. 1997	Cum. 1997	Cum. 1997	Cum. 1997	Cum. 1997
NORTH ATLANTIC RMC											
Walter Reed AMC	-	-	-	-	-	-	-	-	-	-	-
Aberdeen Prov. Ground	-	-	-	-	-	-	-	-	-	-	-
FT Belvoir, VA	-	-	-	-	-	-	-	-	-	-	-
FT Bragg, NC	1	1	3	-	1	-	-	-	1	-	-
FT Drum, NY	-	-	-	-	-	-	-	-	-	-	-
FT Eustis, VA	-	-	-	-	-	-	-	-	-	-	-
FT Knox, KY	-	-	-	-	-	-	-	-	-	-	-
FT Lee, VA	-	-	-	-	-	-	-	-	-	-	-
FT Meade, MD	-	-	1	-	-	-	-	-	-	-	-
USMA, West Point, NY	-	-	-	-	-	-	-	-	-	-	-
CENTRAL RMC											
Fitzsimons AMC	-	-	-	-	-	-	-	-	-	-	-
GREAT PLAINS RMC											
Brooke AMC	-	-	-	-	-	-	-	-	-	-	-
FT Carson, CO	-	-	-	-	-	-	-	-	-	-	-
FT Hood, TX	-	-	2	-	-	-	-	-	-	-	-
FT Leavenworth, KS	-	-	-	-	-	-	-	-	-	-	-
FT Leonard Wood, MO	-	-	-	-	-	-	-	-	-	-	-
FT Polk, LA	-	-	-	-	-	-	-	-	-	-	-
FT Riley, KS	-	-	-	-	-	-	-	-	-	-	-
FT Sill, OK	-	-	-	-	-	-	-	-	-	-	-
Panama	-	-	-	-	-	-	-	-	-	-	-
SOUTHEAST RMC											
Eisenhower AMC	-	-	-	-	-	-	-	-	-	-	-
FT Benning, GA	-	-	-	-	-	-	-	-	-	-	-
FT Campbell, KY	-	-	-	-	-	-	-	1	-	-	-
FT Jackson, SC	-	-	-	-	-	-	-	-	-	-	-
FT McClellan, AL	-	-	-	-	-	-	-	-	-	-	-
FT Rucker, AL	-	-	-	-	-	-	-	-	-	-	-
FT Stewart, GA	-	-	-	-	-	-	-	-	-	-	-
SOUTHWEST RMC											
Wm Beaumont AMC	-	-	-	-	-	-	-	-	-	-	-
FT Huachuca, AZ	-	-	-	-	-	-	-	-	-	-	-
FT Irwin, CA	-	-	-	-	-	-	-	-	-	-	-
NORTHWEST RMC											
Madigan AMC	-	-	-	-	-	-	-	-	1	-	-
FT Wainwright, AK	-	-	-	-	-	-	-	-	-	-	-
PACIFIC RMC											
Tripler AMC	-	-	-	-	-	-	-	-	-	-	-
OTHER LOCATIONS											
Europe	1	-	-	-	-	-	-	4	1	2	-
Korea	-	-	-	1	-	-	-	-	-	-	-
Total	2	1	6	1	1	0	5	2	3	0	0

* Based on date of onset.

** Reports are included from main and satellite clinics. Not all sites reporting.

TABLE II. Cases of notifiable sexually transmitted diseases, United States Army
February, 1997

Reporting MTF/Post*	Chlamydia		Urethritis non-spec.		Gonorrhea		Herpes Simplex		Syphilis Prim/Sec		Syphilis Latent		Other STDs**	
	Cur. Month	Cum. 1997	Cur. Month	Cum. 1997	Cur. Month	Cum. 1997	Cur. Month	Cum. 1997	Cur. Month	Cum. 1997	Cur. Month	Cum. 1997	Cur. Month	Cum. 1997
NORTH ATLANTIC RMC														
Walter Reed AMC	1	7	2	3	1	4	1	3	-	-	-	-	-	-
Aberdeen Prov. Ground	-	1	-	-	-	7	-	-	-	-	-	-	-	-
FT Belvoir, VA	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FT Bragg, NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FT Drum, NY	-	-	1	3	-	5	-	-	-	-	-	-	-	-
FT Eustis, VA	3	3	-	-	-	-	-	-	-	-	-	-	-	-
FT Knox, KY	2	4	-	-	1	9	-	1	-	-	-	-	-	-
FT Lee, VA	4	17	-	-	-	2	-	-	-	-	-	-	-	-
FT Meade, MD	-	4	-	-	-	1	-	1	-	-	-	-	-	-
USMA, West Point, NY	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CENTRAL RMC														
Fitzsimons AMC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GREAT PLAINS RMC														
Brooke AMC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FT Carson, CO	11	33	5	33	3	9	6	11	-	-	-	1	-	-
FT Hood, TX	21	60	11	41	18	32	2	8	-	-	-	-	-	4
FT Leavenworth, KS	-	2	-	-	-	-	-	-	-	-	-	-	-	-
FT Leonard Wood, MO	10	15	1	3	-	7	-	-	-	-	-	-	-	-
FT Polk, LA	17	18	-	-	3	5	-	-	-	-	-	-	3	3
FT Riley, KS	2	13	-	-	-	-	-	-	-	-	-	-	-	-
FT Sill, OK	-	9	-	3	-	2	-	1	-	-	-	-	-	-
Panama	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOUTHEAST RMC														
Eisenhower AMC	6	22	-	-	2	8	1	10	-	-	-	1	2	-
FT Benning, GA	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FT Campbell, KY	15	62	-	-	6	28	2	4	-	-	-	-	-	-
FT Jackson, SC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FT McClellan, AL	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FT Rucker, AL	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FT Stewart, GA	7	14	7	25	3	20	6	10	-	-	-	-	-	-
SOUTHWEST RMC														
Wm Beaumont AMC	4	13	-	-	1	5	1	1	-	-	-	-	-	-
FT Huachuca, AZ	3	4	-	-	-	-	-	-	-	-	-	-	-	-
FT Irwin, CA	1	8	-	-	-	1	-	2	-	-	-	-	-	-
NORTHWEST RMC														
Madigan AMC	6	36	1	5	6	13	3	4	-	-	-	-	-	-
FT Wainwright, AK	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PACIFIC RMC														
Tripler AMC	20	21	-	-	12	12	9	10	-	-	-	-	-	-
OTHER LOCATIONS														
Europe	19	47	4	4	1	21	3	4	-	-	-	-	-	-
Korea	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Total	152	414	32	120	57	191	34	70	0	0	0	1	4	9

* Reports are included from main and satellite clinics. Not all sites reporting.

Date of Report: 7-Mar-97

** Other STDs: (a) Chancroid (b) Granuloma Inguinale (c) Lymphogranuloma Venereum (d) Syphilis unspes. (e) Syph, tertiary (f) Syph, congenital

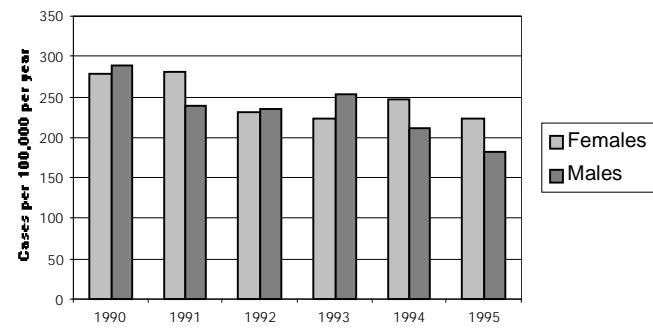
Continued from page 3

occurred at basic training centers among soldiers in the first months of Army service (< 3 months of service: 47%).

Geographic (figure 5, page 11): States of residence prior to service were documented for 1,776,572 soldiers (including 7,666 pneumonia cases) who served on active duty between January 1990 and August 1996. Soldiers from five states and Puerto Rico had significantly more pneumonia hospitalizations than expected; soldiers from seven states had significantly fewer cases than expected (table 1, page 11).

Personal risk factors: We used multivariate analyses to assess the independent predictive effects of gender, age, race/ethnicity, tobacco use (including smokeless tobacco, cigars, and cigarettes), alcohol use, hours of sleep, and indicators of psychosocial stress (e.g., depression, worry, ability to cope, relaxation). In univariate analyses, only gender, alcohol use, pipe smoking, and severity of family problems were not correlated with pneumonia risk. In multivariate analyses that controlled for effects of age and race/ethnicity, only hours of sleep (< 6 hours per night vs. > 6 hours; adjusted relative odds = 1.86) and feelings that life is overwhelming (often vs. sometimes, seldom, or

Figure 2. Pneumonia Hospitalization Rates by Gender, 1990-1995

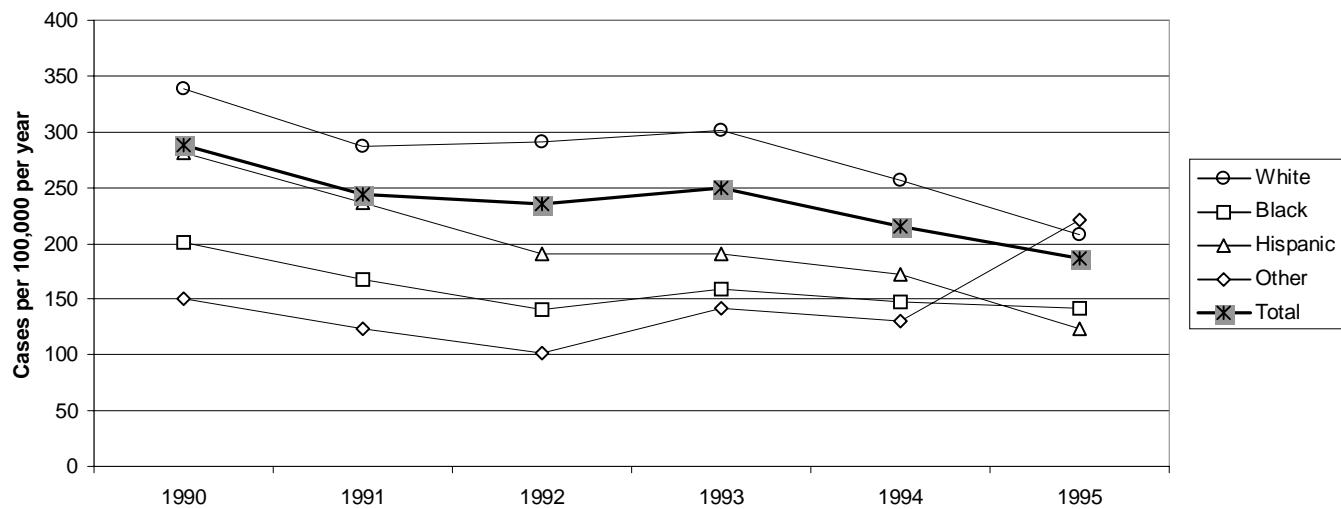


never; adjusted relative odds = 3.28) had strong independent predictive effects.

Editorial comment: In 1994, Gray and colleagues reviewed pneumonia hospitalizations among Navy and Marine Corps personnel during the period 1981-1991¹. They reported a crude rate of 77.6 per 100,000 per year. An earlier study reported a hospitalization rate of 307.6 per 100,000 per year among Navy personnel between 1970 and 1978². The current analysis documents a rate among soldiers (231 per 100,000 per year) that is between the two published Navy rates. Differences in rates between the services may reflect differences in case management (e.g., hospitalization versus

Continued on page 10

Figure 3. Pneumonia Hospitalization Rates by Race/Ethnicity, 1990-1995



Outbreak Reports

Focal Outbreaks of Group A Beta Hemolytic Streptococcus, Fort Leonard Wood, Missouri, and Fort Knox, Kentucky

Outbreak #1

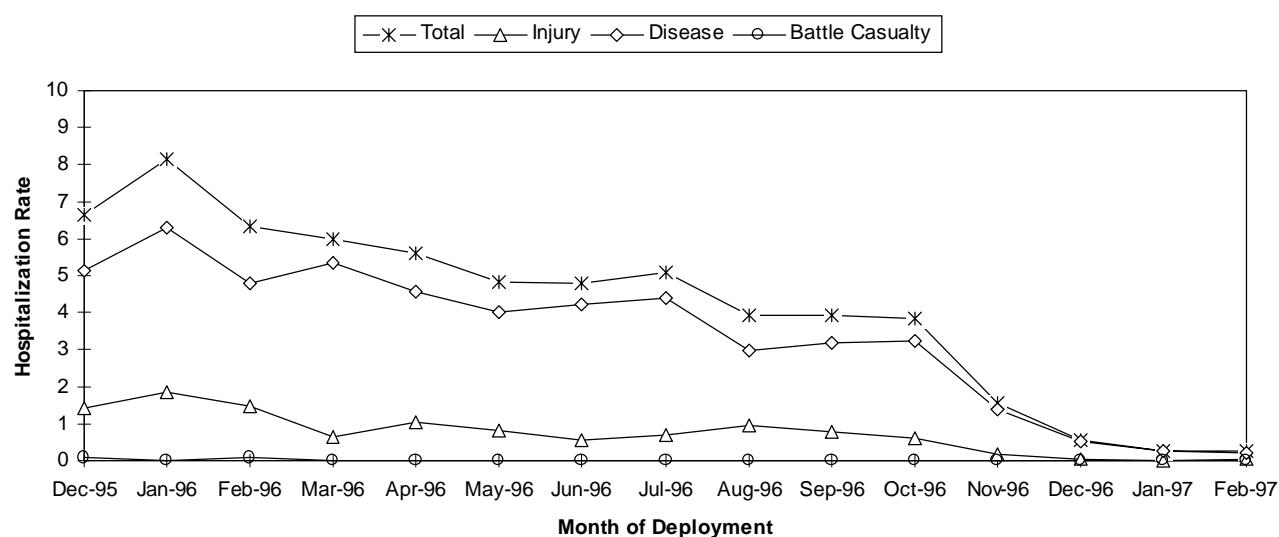
Epidemics of acute febrile illnesses caused by Group A beta hemolytic streptococcus (GABHS) have frequently disrupted initial soldier training at Fort Leonard Wood, Missouri¹. Currently, to prevent GABHS outbreaks, all new accessions who are not penicillin allergic receive an injection of benzathine penicillin during medical in-processing at the Fort Leonard Wood Reception Station. In addition, all trainees who report to sick call with fever and respiratory symptoms receive throat cultures to document the prevalence and the distribution of GABHS in the trainee population.

During the week of 10 February 1997, the Epidemiology and Disease Control Technician of the Preventive Medicine Activity at Fort Leonard Wood noted increases in the number and proportion of throat cultures that were positive for GABHS among trainees of the 169th Engineer Battalion, 1st Training Brigade. The 169th Engineer Battalion has three training companies which conduct one station engineer training in 13-week cycles (i.e., combined basic and advanced individual training). By the week of 23 February, 14 (45%) of 31 throat cultures of trainees of the 169th Battalion were GABHS (+). The recovery rate was higher among trainees cultured as outpatients (10/17=59%) than

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Surveillance Trends, Bosnia

Active Duty Hospitalization Rates*, Operation Joint Endeavor



* Rates are calculated per 1000 soldiers per month

Source: PARRTS Data, USA Patient Administration and Biostatistical Activity, Fort Sam Houston, TX

TABLE III. Active Duty Hospitalization Rates*, Operation Joint Endeavor, 11Dec95 - 7Mar97

ICD-9 Category	Males							Females							All
	< 20	20-24	25-29	30-34	35-39	≥ 40	Total M	< 20	20-24	25-29	30-34	35-39	≥ 40	Total F	
Infectious and Parasitic Diseases	19.2	3.8	2.6	3.0	1.8	0.7	2.9	11.0	4.0	4.2	6.6	0.0	0.0	3.7	2.9
Neoplasms	2.4	0.2	0.3	0.3	0.8	0.7	0.4	11.0	1.6	0.0	0.0	1.8	1.8	1.1	0.5
Endocrine, Nutritional, and Metabolic Disease and Immunity Disorders	2.4	0.2	0.6	0.5	0.3	1.2	0.5	0.0	0.8	0.0	5.3	0.0	0.0	1.1	0.6
Diseases of the Blood and Blood-Forming Organs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mental Disorders	7.2	3.1	1.8	1.4	1.0	1.2	2.0	0.0	4.0	5.1	0.0	3.6	1.8	3.2	2.1
Diseases of the Nervous System and Sense Organs	9.6	2.4	2.5	1.2	3.1	0.9	2.2	0.0	2.4	5.1	5.3	3.6	0.0	3.4	2.3
Diseases of the Circulatory System	2.4	1.1	1.6	3.3	4.2	2.8	2.3	0.0	0.0	0.8	0.0	5.4	1.8	1.1	2.1
Diseases of the Respiratory System	0.0	3.5	2.2	2.8	1.6	2.1	2.6	0.0	8.8	3.4	2.6	3.6	1.8	4.6	2.8
Diseases of the Digestive System	19.2	8.8	6.1	5.6	3.9	3.1	6.2	43.9	8.8	6.8	2.6	7.2	1.8	7.1	6.3
Diseases of the Genitourinary System	2.4	2.5	3.3	3.7	2.9	2.8	3.0	0.0	26.4	12.7	4.0	5.4	7.4	13.2	4.2
Complications of Pregnancy, Childbirth, and the Puerperium**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.8	1.3	0.0	0.0	1.1	0.1
Diseases of the Skin and Subcutaneous Tissue	7.2	2.7	1.1	1.2	0.8	0.7	1.6	0.0	1.6	0.0	2.6	1.8	0.0	1.1	1.5
Diseases of the Musculoskeletal System and Connective Tissue	7.2	4.9	5.7	5.4	2.9	3.1	4.8	0.0	4.0	2.5	0.0	9.0	5.5	3.7	4.6
Congenital Abnormalities	2.4	0.5	0.3	0.2	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Symptoms, Signs, and ill-Defined Conditions	7.2	6.3	4.9	5.1	3.9	2.6	4.9	76.8	23.2	7.6	10.6	5.4	3.7	13.2	5.9
Injury and Poisoning	19.2	13.8	8.7	8.0	5.5	2.6	8.9	32.9	19.2	4.2	4.0	7.2	0.0	8.9	8.9
All Hospitalizations	107.9	53.7	41.7	41.7	32.9	24.6	42.6	175.4	107.4	53.2	44.9	53.7	25.8	66.7	45.5

* Rates are calculated per 1000 soldiers per year based on cumulative person time.

** Includes normal delivery

Source: PARRTS Data, USA Patient Administration Systems and Biostatistical Activity, Fort Sam Houston, TX

Continued from page 7

outpatient care of uncomplicated trainee cases), case definition (e.g., shipboard vs. fixed facility "hospitalizations"), and/or summary methods (e.g., enumeration of person years). In other respects, however, the experiences of the Army and Navy are remarkably similar. For example, in both services, rates were highest among the youngest, most junior members and among whites. In addition, rates among males and females did not significantly vary. Finally, and perhaps most surprising, were the similarities in findings of geographic analyses. The Navy found that sailors from Pennsylvania had the lowest risk of pneumonia while those from California and Florida had the highest. In addition, they found that sailors from southwestern states had increased risk relative to those from the southeast. In the Army, the state with the greatest deficit of pneumonia cases was Pennsylvania while the states with the largest excesses were Florida and California. In addition, soldiers from Nevada and Arizona had pneumonia rates significantly higher than expected by chance alone. While the similarities of the findings in two different military populations during two different time periods are remarkable, explanations for them remain unclear.

Finally, findings with regards to personal risk factors for pneumonia are interesting. For ex-

ample, self reported uses of tobacco and alcohol were not significant predictors of subsequent pneumonia. However, feelings that life frequently exceeds the ability to cope and reduced hours of sleep were significant predictors. Recent studies have reported relationships between psychological stress and host immune responses^{3,4} and between psychological stress and susceptibility to viral upper respiratory infections⁵. Increased rates of acute respiratory illnesses among military trainees have often been attributed at least in part to the extreme physical and psychological stresses of basic training. The findings from this analysis support this common view.

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Figure 4. Pneumonia Hospitalization Rates by Age Group, 1990-1995

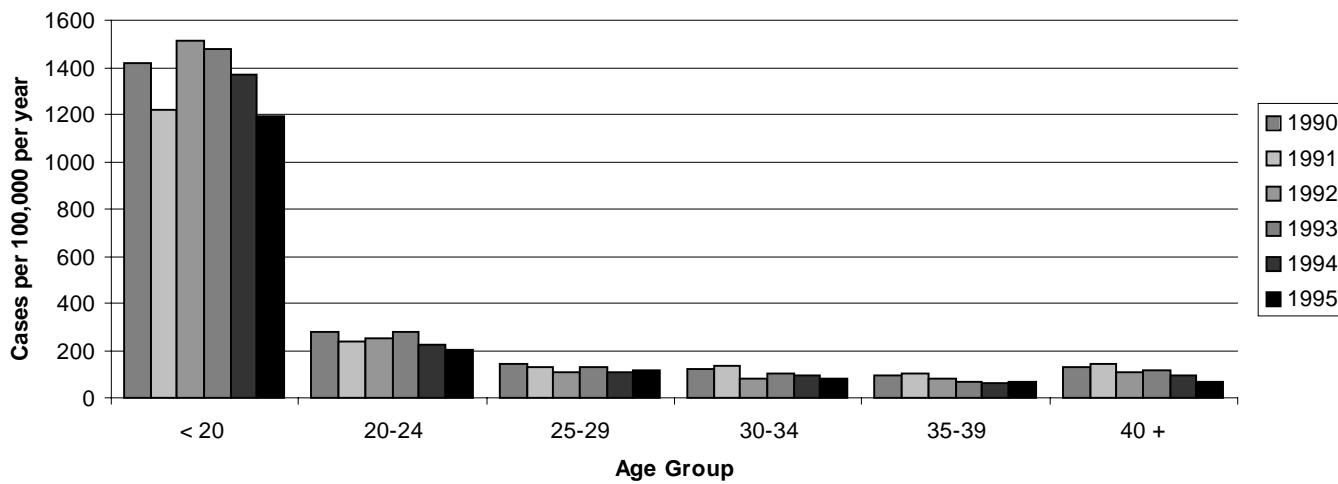
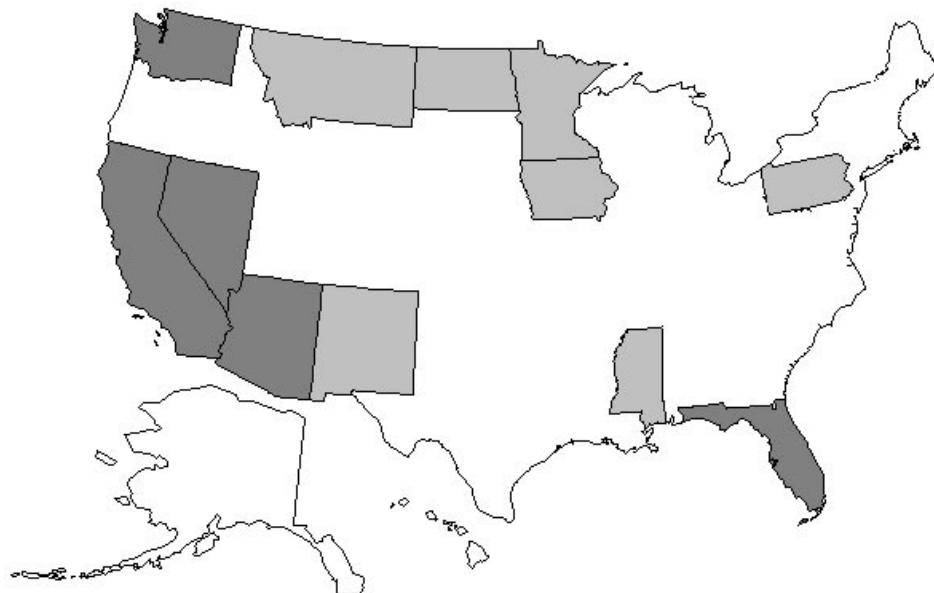


Figure 5. Pneumonia Risk by State of Residence

■ Significant excess ■ Significant deficit □ Not significant

**Table 1. Residence prior to service with significant excess/deficit of pneumonia cases.**

States/territory of residence prior to service with significant excesses of pneumonia on active duty					
	Observed (obs) cases	Expected (exp) cases	Excess cases (obs - exp)	% Excess	P value
Puerto Rico	119	71	48	67.5%	.001
Florida	466	371.4	94.6	25.5%	.001
California	646	547.9	98.1	17.9%	.001
Nevada	51	30.3	20.7	68.6%	.001
Arizona	144	112	32	28.5%	.01
Washington	196	162.3	33.7	20.8%	.01
States of residence prior to service with significant deficits of pneumonia on active duty					
	Observed (obs) cases	Expected (exp) cases	Deficit cases (obs - exp)	% Deficit	P value
Pennsylvania	302	358.2	-56.2	-15.7%	.01
Montana	27	46.1	-19.1	-41.4%	.01
Mississippi	103	132.5	-29.5	-22.3%	.05
Iowa	88	113.5	-25.5	-22.5%	.05
New Mexico	48	65.9	-17.9	-27.1%	.05
North Dakota	22	34.5	-12.5	-36.3%	.05
Minnesota	114	138.1	-24.1	-17.5%	.05

Epidemiologic investigation

Influenza among Soldiers in Advanced Individual Training, Aberdeen Proving Ground, Maryland, December 1996

Background: Aberdeen Proving Ground (APG), Maryland, is the home of the Army's ordnance center and school. The installation has two major subposts, Aberdeen and Edgewood, that are separated by approximately ten miles. Each of the subposts has an advanced individual training (AIT) battalion and a troop medical clinic. On 9 December 1996, five AIT students who presented to the Edgewood clinic with acute febrile respiratory illnesses were referred to Walter Reed Army Medical Center for evaluation and care. Specimens from all five patients were positive for influenza A by a direct antigen detection assay. No further characterization of the strains (e.g., culture, subtype) was attempted. At the same time, physicians at both Aberdeen and Edgewood troop medical clinics perceived increases in the incidence and severity of upper respiratory illnesses among AIT students. On 10 December 1996, an epidemiologic consultant (EPICON) team from the USACHPPM initiated an investigation to document the nature and extent of influenza-like illness among soldiers in AIT at APG and to explain the occurrence of influenza in a purportedly immunized population (since Army policy directs immunization of all soldiers annually with the current year's influenza vaccine).¹

Methods: At Aberdeen and Edgewood clinics, the team reviewed records of soldiers in AIT who presented to sick call with respiratory complaints between 2 and 18 December. Battalion personnel centers provided denominators used for rate calculations. For the investigation, a case of "influenza-like illness" was defined as a soldier in AIT who presented to sick call at Edgewood or Aberdeen clinic between 2 and 18 December with EITHER a diagnosis of "influenza", "flu", or "viral syndrome" OR a fever of 100.5 or greater and at least one sign of respiratory tract inflammation (e.g., pharyngitis,

laryngitis, bronchitis, sinusitis, otitis, cough, coryza).

Epidemiologic findings: Daily rates of sick call for upper respiratory illnesses (URI) are shown in figures 1 and 2 (page 13). At Aberdeen, URI rates were consistently higher on Mondays than on other days of the week; otherwise, URI rates were relatively stable during the period. In contrast, URI rates at Edgewood were highest during the week of 8-14 December, the week when the laboratory-confirmed influenza cases and all URIs that met the case definition of "influenza-like illness" presented to Edgewood clinic.

Table 1. Results of records review.

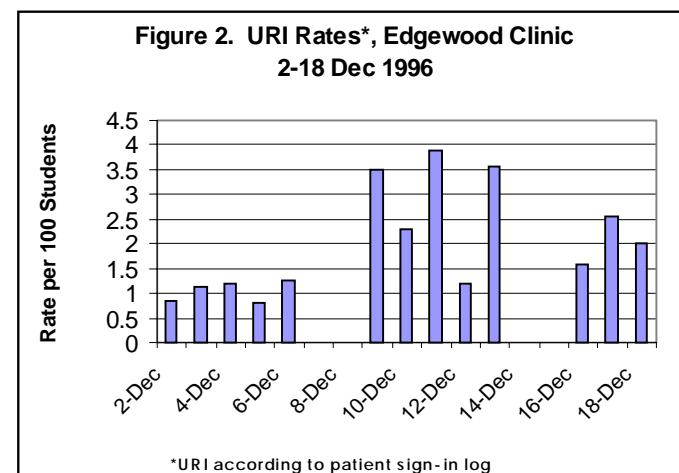
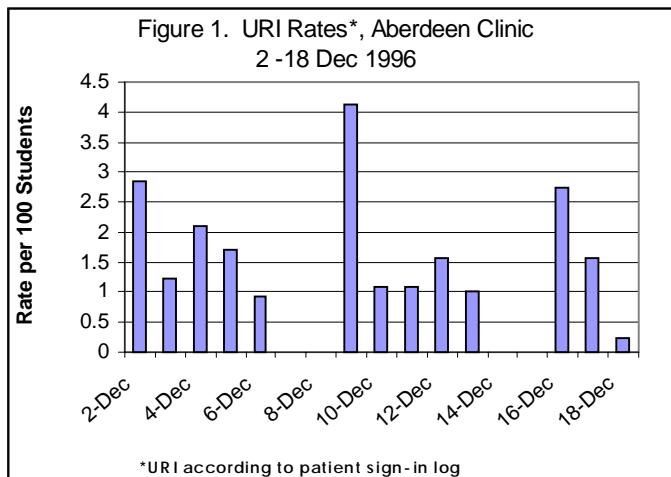
	Aberdeen Clinic	Edgewood Clinic
Sick call visits (total)	581	422
# (%) with URI complaints	243 (42%)	176 (42%)
# (%) reviewed	72 (30%)	46 (26%)
# (%) fit case definition	5 (7%)	24 (52%)

If the records available for review (see table 1) were representative of all AIT soldiers with URI, then during the period of interest, there were 92 soldiers at Edgewood and 17 at Aberdeen that met the case definition of "influenza-like illness."

Immunization findings: In late October 1996, the Preventive Medicine Service at APG conducted mass immunizations of all soldiers in AIT with the 1996-97 influenza vaccine. However, many soldiers in AIT in December were in basic training or on leave enroute to APG at the time of the October mass immunization campaign. The investigation in December found that many medical records lacked documentation of any immunizations. Immunization records that were available documented that AIT

students received the 1995-96 influenza vaccine during their basic training. Only a few records documented receipt of the current year's influenza vaccine. Of the five laboratory-proven influenza cases, none received the current vaccine. Around the time of the outbreak, there were reports that certain lots produced by one manufacturer lacked immunogenic potency against circulating influenza A strains. None of the implicated vaccine lots were used at Aberdeen or Edgewood.

Editorial comment: There was an outbreak of influenza-like illness among AIT students at the Edgewood subpost of Aberdeen Proving Ground during the week of 8-14 December 1996. Influenza A was detected in clinical specimens from five affected soldiers (of five that had laboratory evaluations). It is likely that influenza A accounted for most, if not all, of the excess respiratory illness



associated with the outbreak. The outbreak did not represent a failure of the current year's influenza vaccine; rather, it occurred among soldiers who received only the prior year's vaccine. The outbreak was small because the affected battalion was isolated from other large susceptible populations, and it was self-limited because all trainees were released to holiday leave on 18 December. This outbreak emphasizes the importance of ensuring that all soldiers, particularly trainees, maintain immunologic protection against circulating strains of influenza. In particular, soldiers that are on leave, temporary duty, or who are otherwise not available during fall immunization campaigns should be identified and immunized as soon as they are accessible to military medical care.

Reference

1. OTSG memorandum, dated 30 Sep 96, subject: 1996-97 influenza immunization policy.

Continued from page 8

among those hospitalized (4/14=29%). All companies of the battalion were affected. There were no unusual or severe acute, systemic, or chronic clinical manifestations of the GABHS infections.

Since two of the three companies of the battalion were within a week of graduating, a throat culture survey was conducted among trainees and cadre of C Company—which was in its 7th week of training—to assess the background prevalence of GABHS in the battalion. Of 185 throat cultures done, 41 (22%) were GABHS (+). All trainees and cadre with GABHS (+) throat cultures were treated with 1.2 million units of benzathine penicillin.

Since the time of the survey, GABHS (+) throat cultures have been documented with low frequency among trainees of C Company, 169th Battalion. During the same period, rates of acute respiratory illnesses and of GABHS recovery have declined, and no severe or unusual clinical manifestations of GABHS have been detected among Fort Leonard Wood trainees.

Information submitted by Robert Greenup, Preventive Medicine Activity, Fort Leonard Wood, Missouri.

Outbreak #2

On 24 January 1997, the Epidemiology Section of the Preventive Medicine Service, Fort Knox, Kentucky, noted a cluster of four GABHS (+) throat cultures from trainees in A Company, 2-46 Infantry. In the next five days, four additional GABHS (+) cultures were reported from trainees in the company. An epidemiologic investigation was conducted by the local Preventive Medicine staff.

There were 210 trainees assigned to the affected company. During the period 22 January–4 February, 105 (50%) of them attended sick call, and 42 were treated with either benzathine penicillin or erythromycin at the time of the visit. On 4 February, seven additional GABHS (+) throat cultures were reported from trainees in the company.

On 5 February, all trainees and cadre of A Company who were not allergic to penicillin and who were not treated in the previous two weeks received benzathine penicillin. Those allergic to penicillin (n=19) were deferred. In the next two weeks, there were two GABHS (+) cultures from soldiers in A Company—both were trainees allergic to penicillin.

In summary, in the ten days prior to mass treatment, 105 trainees (50%) of A Company attended sick call, and 15 (7.1%) had GABHS (+) throat cultures. During the two weeks following mass treatment, 35 trainees (14%) attended sick call, and only two (0.9%) had GABHS (+) throat cultures.

Information provided by Dallas C. Hack, LTC, MC, and Lea Ann Young, Preventive Medicine Service, Fort Knox, Kentucky.

Editorial comment: These reports document the spread and subsequent high prevalences of GABHS among trainees in isolated units at Fort Leonard Wood and Fort Knox. In the Army, for surveillance purposes, there are training center wide “action thresholds” for acute respiratory disease and group A beta hemolytic streptococcal activity. In the outbreaks described above, the surveillance thresholds were not exceeded since the outbreaks were confined to subunits of the entire trainee populations. It is possible that early detection of high GABHS prevalences in specific trainee units followed by focused interventions with benzathine penicillin may have prevented widespread morbidity and lost training time among trainees and cadre at these centers.

Reference

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ARD Surveillance UpdateLegend

—	ARD Rate	= (ARD cases / Trainees) * 100
— · —	SASI*	= ARD Rate * Strep Rate**

Ft Benning

Ft Jackson

Ft Knox

Ft Leonard
Wood

Ft McClellan

Ft Sill

Table IV. ARD surveillance rates, submitted by Army TRADOC posts

* Strep/ARD Surveillance Index (SASI)

**Strep Rate= (GABHS(+)/ Cultures) *100

Note: SASI has proven to be a reliable predictor of serious strep-related morbidity, especially acute rheumatic fever.

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